WHAT IS CLAIMED IS:

1. A helmet comprising:

an inner helmet layer;

an outer helmet layer; and

an interface layer disposed between the inner and outer helmet layers, the interface layer allowing displacement of the outer helmet layer with respect to the inner helmet layer in response to a tangential impact force applied to the outer helmet layer.

2. The helmet of claim 1, wherein the outer helmet layer comprises a hard shell, and wherein the inner helmet layer comprises an energy-absorbing layer.

3. The helmet of claim 1, wherein the outer helmet layer comprises a first energy-absorbing layer and a microshell at least partially overlying the first energy-absorbing layer, and wherein the inner helmet layer comprises a second energy-absorbing layer.

4. The helmet of claim 1, further comprising a helmet retention system to secure the inner helmet layer to a wearer's head.

5. The helmet of claim 1, the helmet comprising features to constrain the allowable displacement to rotational displacement along a single axis of rotation.

6. The helmet of claim 1, wherein the interface layer has a spherical curvature, such that the allowable displacement comprises rotational displacement in a plurality of axes of rotation.

7. The helmet of claim 6, wherein the interface layer has a substantially uniform thickness.

8. The helmet of claim 1, wherein the interface layer substantially fills a gap between the inner and outer helmet layers.

9. The helmet of claim 1, further comprising a plurality of air vents passing through the inner and outer helmet layers to allow air movement between the exterior of the helmet and the interior of the helmet.

10. The helmet of claim 9, wherein a connecting member joins the inner and outer helmet layers around the periphery of one or more of the air vents.

11. The helmet of claim 10, wherein the connecting member substantially prevents displacement of the outer helmet layer with respect to the inner helmet layer, and fails when a tangential impact force indicative of a crash is applied to the outer helmet layer.

12. The helmet of claim 1, wherein at least one connecting member joins the inner and outer helmet layers, substantially prevents displacement of the outer helmet layer with respect to the inner helmet layer, and fails when a tangential impact force indicative of a crash is applied to the outer helmet layer.

13. The helmet of claim 12, wherein the connecting member is positioned around the

periphery of the helmet.

14. The helmet of claim 1, wherein the interface layer responds non-linearly to tangential forces, such that tangential forces less than a threshold force result in relatively small elastic displacements, and a tangential force larger than the threshold force causes an inelastic change in the interface layer after which tangential forces smaller than the threshold force cause relatively large displacements.

15. The helmet of claim 1, wherein the interface layer comprises an envelope attached to the inner and outer helmet layers, the envelope containing a viscous medium.

16. The helmet of claim 1, wherein the interface layer comprises a hyper-elastic structure.

17. The helmet of claim 16, wherein the hyper-elastic structure comprises a formable gel.

18. The helmet of claim 16, wherein the hyper-elastic structure comprises an elastomer-based lamellar structure.

19. The helmet of claim 1, wherein the outer helmet layer comprises a first solid shell, and the interface layer comprises a second solid shell attached to the inner helmet layer and in contact with the first solid shell, such that allowed displacement occurs between the first and second solid shells.

20. The helmet of claim 19, further comprising a lubricant disposed between the first and second solid shells.

21. The helmet of claim 1, wherein the interface layer is adapted to at least partially dampen impact energy applied normal to the surface of the outer helmet layer.

22. The helmet of claim 1, wherein the outer helmet layer has a front lower surface capable of extending, during a forward displacement, to provide additional facial protection to a wearer.

23. The helmet of claim 1, wherein at least one displacement-impeding member protrudes into the interface layer from the inner or outer helmet layer, the at least one displacement-impeding member substantially impedes displacement of the outer helmet layer with respect to the inner helmet layer, and fails when a tangential impact force indicative of a crash is applied to the outer helmet layer

24. A method of head protection, comprising:

joining an inner helmet layer, an outer helmet layer, and an interposed interface layer that allows relative displacement between the inner and outer helmet layers; and

in response to a tangential impact force applied to the outer helmet layer, displacing the outer helmet layer with respect to the inner helmet layer.

25. The method of claim 24, wherein displacing the outer helmet layer with respect to the inner helmet layer comprises responding to a tangential force less than a threshold force with a relatively small elastic displacement, and responding to a tangential force larger than the threshold force by inelastically changing the interface layer, after

which tangential forces smaller than the threshold force cause relatively large displacements.

26. The method of claim 25, wherein the interface layer comprises at least one connecting member connecting the outer and inner helmet layers, and wherein inelastically changing the interface layer comprises severing the connection formed by the connecting member.

27. The method of claim 24, wherein the interface layer has a substantially spherical curvature, and wherein displacing the outer helmet layer with respect to the inner helmet layer comprises rotationally displacing the outer helmet layer with respect to the inner helmet layer.

28. The method of claim 24, wherein the inner helmet layer comprises at least an energy-absorbing sublayer, the method further comprising absorbing normal impact forces applied to the outer helmet layer over an extended area of the inner helmet layer during the displacement of the outer layer.

29. A helmet comprising:

an inner helmet assembly having a first energy-absorbing layer and a helmet retention system to secure the first energy-absorbing layer to a wearer's head;

an outer helmet assembly having a second energy-absorbing layer; and

an interface layer disposed in a region of substantially spherical curvature between the inner and outer helmet assemblies, the interface layer allowing rotational displacement of the outer helmet assembly with respect to the inner helmet assembly

in response to a tangential impact force applied to the outer helmet assembly.

30. The helmet of claim 29, further comprising at least one connecting element to attach the inner and outer helmet assemblies and substantially impede rotational displacement between the two assemblies until the helmet is subjected to a significant impact force.

31. The helmet of claim 29, further comprising at least one displacement-impeding element protruding from either the inner or outer helmet assembly into the interface layer and substantially impeding rotational displacement between the two assemblies until the helmet is subjected to a significant impact force.

32. A helmet comprising:

an inner helmet assembly having a first energy-absorbing layer and a helmet retention system to secure the first energy-absorbing layer to a wearer's head;

an outer helmet assembly having a rigid layer; and

an interface layer disposed in a region of substantially spherical curvature between the inner and outer helmet assemblies, the interface layer allowing rotational displacement of the outer helmet assembly with respect to the inner helmet assembly in response to a tangential impact force applied to the outer helmet assembly.

33. The helmet of claim 32, further comprising at least one connecting element to attach the inner and outer helmet assemblies and substantially impede rotational displacement between the two assemblies until the helmet is subjected to a significant impact force.

34. The helmet of claim 32, further comprising at least one displacement-impeding element protruding from either the inner or outer helmet assembly into the interface layer and substantially impeding rotational displacement between the two assemblies until the helmet is subjected to a significant impact force.